Intense hadron beams for research into matter at extremes

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The next generation of heavy ion drivers—NICA, FAIR, HIAF—will provide worldwide unique accelerator and experimental facilities allowing for a large variety of unprecedented fore-front research in extreme state of matter physics, nuclear astrophysics and applied science. This presentation outlines ongoing activities on development of accelerator facilities, providing high-brightness beams capable of generating intense beams in conventional and collider modes as well. Manifested facilities goals are pushing the "intensity" and the "precision frontiers" to the extremes when accelerating full range of ion beam species from p^+ to U, electron-positron colliders to highest beam intensities and luminosities.

Overview of the rapid progress in development of heavy ion accelerator facilities worldwide and in JINR is presented. Dubna accelerators are capable of generating high-brightness intense beams of heavy ions and protons for basic research and for various applications. Construction of new generation of heavy ion accelerator facilities is progressing well and forefront accelerator technologies are under development for low energy as well as for relativistic heavy ion and proton beams.